National Health and Nutrition Examination Survey 2003-2004

Documentation, Codebook, and Frequencies

MEC Laboratory Component:
Triglycerides and LDL-Cholesterol

Survey Years:
2003 to 2004

SAS Export File:
L13AM_C.XPT

First Publish: September2006
Last Revised: N/A

NHANES 2003–2004 Data Documentation

Laboratory Assessment: Lab 13AM – Triglycerides and LDL-Cholesterol

Years of Coverage: 2003–2004 **First Published:** September 2006 **Last Revised:** N/A

Component Description

The goals of this component are: 1) to monitor the prevalence and trends in major cardiovascular conditions and risk factors in the U.S.; and 2) to evaluate prevention and treatment programs targeting cardiovascular disease in the U.S.

The main element of the cardiovascular disease laboratory component in NHANES is blood lipid levels. Cardiovascular disease is the leading cause of death in the United States. An estimated 4.8 million Americans now have congestive heart failure. Increasing prevalence, hospitalizations, and deaths have made congestive heart failure a major chronic condition in the United States. The data will be used to monitor the status of hyperlipidemia and the success of the National Cholesterol Education Program.

Eligible Sample

Participants aged 3 years and older who were examined in the morning (AM) session were tested.

Description of Laboratory Methodology

Triglycerides

Triglycerides are measured enzymatically in serum using a series of coupled reactions in which triglycerides are hydrolyzed to produce glycerol. Glycerol is then oxidized using glycerol oxidase, and H_2O_2, one of the reaction products, is converted via peroxidase to a phenazone. Absorbance is measured at 500 nm.

High levels of serum triglycerides help determine the risk for coronary heart disease (CHD) and peripheral atherosclerosis. High triglycerides are associated with increased risk for coronary artery disease (CAD) in patients with other risk factors, such as low high-density lipoproteins (HDL)-cholesterol, some patient groups with elevated apolipoprotein B, and patients with forms of low-density lipoproteins (LDL) that may be particularly atherogenic. Desirable fasting triglyceride levels are considered to be those below 150 mg/dL and are further categorized as Borderline High, 150–199 mg/dL; High, 200–499 mg/dL; and Very High, > =500 mg/dL. Very high triglycerides can result in pancreatitis.

Triglycerides are also measured because the value is used to calculate LDL-cholesterol concentrations. In NHANES, triglycerides are only

measured in specimens from the morning session. Sample persons ages 12 and above and fasting at least 8.5 hours or more but less than 24 hours have values and have non-zero fasting sample weights. Morning (non-fasting) weights are provided for participant's aged 3–11 years.

LDL-Cholesterol

Most of the circulating cholesterol is found in three major lipoprotein fractions: very low-density lipoproteins (VLDL), LDL, and HDL. LDL-cholesterol is calculated from measured values of total cholesterol, triglycerides, and HDL-cholesterol according to the Friedewald calculation:

[LDL-cholesterol] = [total cholesterol] – [HDL-cholesterol] – [triglycerides/5]

where [triglycerides/5] is an estimate of VLDL-cholesterol and all values are expressed in mg/dL. The calculation is valid for triglycerides less than or equal to 400 mg/dL.

LDL carries most of the circulating cholesterol and, when elevated, contributes to the development of coronary atherosclerosis. LDL-cholesterol is measured to assess risk for CHD and to follow the progress of patients being treated to lower LDL-cholesterol concentrations. Desirable levels of LDL-cholesterol are below 100 mg/dL; borderline low from 100–129 mg/dL borderline high is from 130–159 mg/dL; high is from 160–189 mg/dL; and very high LDL-cholesterol is greater than or equal to 190 mg/dL. LDL-cholesterol is reported only for fasting (at least 8.5 hours or more but less than 24 hours) participants aged 12 and above who were examined in the morning sessions.

There were no changes to the equipment, lab method, or lab site from the previous 2 years.

A detailed description of the laboratory method used can be found on the NHANES Web site.

Laboratory Quality Control and Monitoring

The NHANES quality assurance and quality control (QA/QC) protocols meet the 1988 Clinical Laboratory Improvement Act mandates. Detailed QA/QC instructions are discussed in the NHANES Laboratory/Medical Technologists Procedures Manual (LPM). Read the LABDOC file for detailed QA/QC protocols.

A detailed description of the quality assurance and quality control procedures can be found on the NHANES Web site.

Data Processing and Editing

Blood specimens were processed, stored and shipped to Johns Hopkins Hospital, Baltimore, Maryland for analysis. Detailed specimen collection and processing instructions are discussed in the NHANES LPM. Read the LABDOC file for detailed data processing and editing protocols. The analytical methods are described in the **Description of the Laboratory Methodology** section.

There was no top coding in this file.

Two derived variables were created in this data file. The formula for their derivation is as follows:

LBDTRSI

The triglycerides value in mg/dL (LBXTR) was converted to mmol/L (LBDTRSI) by multiplying by 0.01129.

LBDLDL

Serum LDL-cholesterol levels were derived on examinees that were examined in the morning session only. The distribution of serum LDL-cholesterol should be estimated only on examinees aged 12 and above who fasted at least 8.5 hours or more but less than 24 hours, were examined in the morning, and were randomly assigned to the morning fasting sample. LDL-cholesterol is calculated from measured values of total cholesterol, triglycerides, and HDL-cholesterol according to the Friedewald calculation:

[LDL-cholesterol] = [total cholesterol] – [HDL-cholesterol] – [triglycerides/5]

where all values are expressed in mg/dL. The calculation is valid for triglycerides less than or equal to 400 mg/dL.

LBDLDLSI

The LDL-cholesterol in mg/dL (LBDLDL) was converted to mmol/L (LBDLDLSI) by multiplying by 0.02586.

Detailed instructions on specimen collection and processing can be found on the NHANES website.

Analytic Notes

The analysis of NHANES 2003–2004 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 2003–2004 Household Questionnaire Data Files contain demographic data, health indicators, and other related information

collected during household interviews. They also contain all survey design variables and sample weights for these age groups. The phlebotomy file includes auxiliary information such as the conditions precluding venipuncture. The household questionnaire and phlebotomy files may be linked to the laboratory data file using the unique survey participant identifier SEQN.

LBXTR

Serum triglyceride levels were measured on examinees that were examined in the morning session only. The distribution of serum triglycerides should be estimated only on examinees aged 12 and above who fasted at least 8.5 hours or more but less than 24 hours, were examined in the morning, and were randomly assigned to the morning fasting sample.

The Laboratory 13AM data file contains laboratory test results for triglycerides (LBXTR), which uses the reference analytic method. However, the NHANES Lab 40 biochemistry profiles also include measurements of triglycerides. The Lab 40 variable name is LBXSTR. The appropriate variable to use is LBXTR from Lab 13AM.

Sampling Weights: WTSAF2YR (Fasting weights for participants 12+ years and morning weights for 3-11 years)

Participants were assigned to MEC in the morning, afternoon or evening sessions. One-half of the participants were assigned to the morning session. Participants examined in the morning session ages 12 years and above were requested to fast at least 8.5 hours prior to phlebotomy and participants ages 3-11 years were not required to fast.

For participants 12 years and older, subsample weights were generated to account for different response rates between the morning MEC session and the afternoon/evening MEC sessions. Subsample weights were generated for participants in the morning session because of nonresponse due to non-fasting and phlebotomy refusals. Thus, these weights are referred to as “fasting” weights. Fasting weights were generated for the diabetes laboratory testing (Laboratory 10AM) and were also used for triglycerides and LDL cholesterol (Laboratory 13AM) because multiple sets of fasting weights were not desirable. Non-zero fasting weights were generated for sample persons 12 years and older, who fasted 8.5 up to 24 hours and were examined in the morning session. In addition, these sample persons were never told by a healthcare provider that they had diabetes (DIQ010 ≠ 1) and had non-missing glucose values or the healthcare provider said they had diabetes (DIQ010 = 1). The analyst is strongly encouraged to use these

weights (WTSAF2YR) to analyze 2003-2004 triglycerides and LDL-cholesterol for participants 12 years and older. The use of the full sample MEC examined weights (WTMEC2YR) should not be used to analyze the data.

Subsample weights are also provided for participants ages 3–11 years. The analyst should use these weights for 3-11 years with great caution. Many of these participants were not fasting and these weights were not adjusted for nonresponse in this age group. Weights (WTSAF2YR) for ages 3-11 are referred to as “morning” weights because they were not adjusted for nonresponse or non-fasting. The analyst may wish to consider the issue of re-weighting the data for 3-11 years. Therefore, when considering the analysis of data for ages 3 and over, the analyst should analyze the data with great caution because of the different weighting methodology and fasting protocols for the participants between ages 3-11 and ages 12 and over.

See the Analytic Guidelines regarding applying weights for analysis of data.

References

N/A

Locator Fields

Title: Triglycerides and LDL-Cholesterol

Contact Number: 1-866-441-NCHS

Years of Content: 2003–2004

First Published: September 2006

Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: Triglycerides and LDL-Cholesterol

Record Source: NHANES 2003–2004

Survey Methodology: NHANES 2003–2004 is a stratified multistage probability sample of the civilian non-institutionalized population of the U.S.

Medium: NHANES Web site; SAS transport files

National Health and Nutrition Examination Survey
Codebook for Data Production (2003-2004)

Triglycerides and LDL-Cholesterol (L13AM_C)
Person Level Data

First Published: September 2006
Last revised: N/A

SEQN	Target
	B(3 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Respondent sequence number
English Text: Respondent sequence number.	
English Instructions:	

WTSAF2YR	Target
	B(3 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	2Yr AM(3-11) & fasting (12+) weights
English Text: 2Yr AM(3-11) & fasting (12+) weights	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0 to 355659.4	Range of Values	4034	4034	
.	Missing	0	4034	

LBXTR	Target
	B(3 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Triglyceride (mg/dL)
English Text: Triglyceride (mg/dL)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
20 to 2740	Range of Values	3680	3680	
.	Missing	354	4034	

LBDTRSI	Target
	B(3 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	Triglyceride (mmol/L)
English Text: Triglyceride (mmol/L)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0.226 to 30.935	Range of Values	3680	3680	
.	Missing	354	4034	

LBDLDL	Target
	B(3 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	LDL-cholesterol (mg/dL)
English Text: LDL-cholesterol (mg/dL)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
21 to 629	Range of Values	3618	3618	
.	Missing	416	4034	

LBDLDLSI	Target
	B(3 Yrs. to 150 Yrs.)
Hard Edits	**SAS Label**
	LDL-cholesterol (mmol/L)
English Text: LDL-cholesterol (mmol/L)	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
0.543 to 16.266	Range of Values	3618	3618	
.	Missing	416	4034	